

Assessment of Student Learning: Direct and Indirect Methods that Work

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Introduction

The purpose of this presentation is to explain the generally accepted principles of good practice for assessing student learning and describe methods to implement an effective assessment program. However, assessment is not an end in itself but more importantly a means for continuous educational improvement. As such, an effective assessment program becomes the basis for continuous improvement in our higher educational efforts. In addition, an effective assessment program can provide a means to enhance stakeholder involvement and ownership in our educational process. Although this stakeholder or constituency involvement is required in universities offering ABET accredited safety-related degree programs, it is highly recommended for any institution of higher education interested in improving their educational efforts.

On the downside, an assessment program requires considerable effort and can be a significant burden on program faculty and administrators without generating any positive results. To generate desired results, the assessment data must be collected, analyzed, evaluated, and used in decision-making as part of a continuous improvement process. Accepted principles of good practice for assessing student learning must be followed and effective assessment methods used for the data to be useful for fact-based program improvements. The following principles of good assessment practice are distilled from work developed under the auspices of the American Association for Higher Education Assessment Forum.

Principles of Good Assessment Practice

The first essential principle of good practice is that effective assessment must be driven by the institution's educational mission and core objectives to ensure a process for improving what we truly value. More specifically educational outcomes associated with curricular course work must relate directly back to the safety degree program mission and associate educational objectives. Development of educational outcomes and longer range educational objectives requires involvement and insights from employers, industry advisors, alumni, faculty, internal and external program evaluators, and our professional society. The role and responsibility of each group must be defined and incorporated into a comprehensive assessment plan for continuous improvement.

The next principle is based on the fact that learning is multidimensional, integrated, and revealed in improved performance over time of matriculation. Learning involves not only knowledge and ability to apply that knowledge but values and attitudes that affect academic success and job performance beyond the classroom. Assessment should reflect this understanding by employing diverse methods over time of matriculation for a more complete and accurate picture of student learning. Effective assessment works best when it is ongoing, not episodic. Although an isolated, one-shot assessment is better than nothing, improvement over time is the intent of an effective continuous improvement program. Effective assessment planning is essential to gaining insights into student learning and development.

Another principle of good practice recognizes that assessment of student learning is not limited to a small group of academic experts but must be a collaborative activity by all parties with a stake in the educational process; students, faculty, alumni, employers, and industry advisors. To effectively gain assessment insight from this diverse group of stakeholders requires a diverse set of assessment tools and methods. Carrying out assessment activities with this diverse group requires evaluation of various aspects of an educational program from assessment of classroom learning and program outcomes to evaluation of longer range program educational objectives. Development of an effective assessment plan is essential to ensure manageable, sustainable, and effective data collection processes.

Finally it should be recognized that effective assessment is about quality assurance. We as educators have a responsibility to students, parents, and employers that support or depend on us to provide an educational experience that meets their collective needs. Educators can not satisfy this responsibility without close collaboration with recent graduates and employers that hire these graduates. We must involve these constituents in the assessment process. An effective assessment program involving these stakeholders is the basis for the continuous improvement we need to stay abreast of our ever changing global society and associated educational needs.

Data Collection Methods

The question now becomes what methods are we going to use to collect meaningful data that satisfies these principles of good practice for assessing student learning outcomes and longer range educational objectives? Most assessment experts agree that a variety of assessment methods must be used to get adequate feedback to measure student learning and educational program success. There are basically two types of assessment methods, direct and indirect. Direct methods of assessment require the student to produce evidence of learning that a reviewer can assess how well the student meets expectations. Indirect methods of assessment allow the student, or others associated with the student, to reflect on the student's level of learning and provide the reviewer with their perceptions of learning attainment. At least one direct measure of assessment is considered by many, including ABET, to be essential to measure learning outcomes. Indirect methods are often helpful in interpreting the findings of the direct methods. Following are some of the more common examples of direct and indirect methods of assessment:

Direct Methods of Assessment

- Comprehensive examinations to include faculty, commercial, and standardized designs
- Certification or licensure examinations
- Course assignments and research papers
- Capstone or senior project evaluations
- Internship portfolio evaluations
- Reflective journal evaluations
- Writing proficiency examinations
- Oral presentation evaluations with criteria or rubrics
- Case study evaluations

Indirect Methods of Assessment

- Internal/external peer reviews of performance
- Exit interviews/surveys
- Alumni surveys
- Employer surveys
- Student satisfaction surveys
- Student course evaluations
- Graduation and retention rates
- Job placement of graduates
- Focus group discussions
- Graduate school acceptance rates
- Alumni honors, awards, and achievements

Although all of these direct and indirect methods work, some may work better than others for any given situation. The most effective direct methods this author has used are addressed as follows. Evaluation of course assignments and research papers is essential when attempting to relate student learning to identified educational program relative to

identification, evaluation, and control of workplace hazards. Tests are commonly used to determine lower levels of learning at the knowledge, comprehension, and application levels. A comprehensive, program developed test can be designed in conjunction with a senior capstone course or internship to address educational education outcomes. Course-embedded assessments can be used throughout the educational experience to simplify and structure the assessment process somewhat by identifying specific assignments, papers or exam questions that address specific outcomes. Direct methods can also be developed to address oral and written communication skills using criteria or rubrics to ensure consistent evaluations. Rubrics to address oral and written assignments are ready available on several internet sites easily assessable through Google.

ABET Requirements

Internships

An experiential learning component is required in an ABET accredited safety-related program and is required in most other higher education safety-related degree programs. A properly structured internship can very effectively serve as a capstone experience for direct assessment of student development and educational program outcomes. An internship portfolio, including a reflective paper on the student entire college experience as it relates to the intended program outcomes and the internship work experience, can provide the basis for direct assessment of the student's educational experience. Since documentation of the internship experience is usually required, this direct assessment adds little additional faculty work load. With some specific direction to the intern, the portfolio can be structured to document student learning over the course of the entire educational experience.

Peer Review Process

External peer review is a widely accepted indirect method for assessing both short term educational program outcomes and longer term educational objectives. Both regional and program specific accrediting bodies rely on the peer review process to assess student learning as it relates to established outcomes and university/departmental missions. The ABET safety-related program accreditation process has proven effective in identifying program strengths and weakness and contributing to educational program structural changes leading to continuous improvement of the delivered educational product. The ABET program evaluation team is composed of peer educators and industry safety professionals that help ensure the educational outcomes are meeting constituencies' needs and thereby ensuring a quality educational experience for both student and employer.

Surveys

Student, alumni, and employer surveys are becoming increasingly important in understanding student educational needs and overall effectiveness of the educational experience. Student exit surveys and interviews provide important insights into student perceptions of their various courses, instructional approaches, the learning environment,

curricular strengths and weakness, and their overall satisfaction with their college experience. Alumni surveys are useful in determining preparation for professional practice, curricular relevance to job requirements, and achievement of both educational outcomes and longer range educational objectives. These stakeholders in the educational process are particularly important to the educational program's continuous improvement process. Employer surveys provide critical insights relative to the educational program's ability to graduate students that meet ever changing employer needs. These surveys assess employer perceptions of graduates' knowledge and skills as well as programmatic characteristics needed for a successful educational experience. Employer assessment is another critical component in the continuous improvement process. These surveys coupled with regular curricular reviews by faculty and industry advisors ensures courses are revised to meet changing needs in educational outcomes to ensure a quality educational experience.

Conclusion

An assessment process built on generally accepted principles of good practice for assessing student learning that incorporates these direct and indirect methods can yield significant insights into student learning and professional development. Applying knowledge gained in this assessment process should result in the continuous improvement that ensures the quality higher education required to meet the demands of the 21st century safety and health professional.